

## Milk Banking in the Prairie and Dairy States



Summer Kelly, RN, MS, IBCLC  
Mothers' Milk Bank of the Western Great Lakes

## Disclosures

- I have no financial interest or other relationship with any manufacturer/s of any commercial products.
- I work at Mothers' Milk Bank of the Western Great Lakes.



Plant Natives



Buy Local

## Objectives

1. Identify two indications for donor milk use in the hospital setting.
2. Compare and contrast milk depots and milk dispensaries.
3. Identify one way that bereavement donation can help parents honor their child's legacy.



### Rusty Patched Bumble Bee Midwest Plant Guide

Midwest includes IA, IL, IN, MI, MN, MO, OH, and WI  
 \* = superfood plants with nectar rich in amino acids  
 † = known immune building plants for bumble bees  
 ☉ = Full sun ☼ = Part shade/sun ● = Shade  
 For more information: <https://go.usa.gov/xNNWn>



Photo by Susan Day, UW-Madison Arboretum

<https://www.fws.gov/midwest/endangered/insects/rpbb/>

### Resources

<https://xerces.org>

<https://beespotter.org>

<https://www.illinoiswildflowers.info>

<https://arboretum.wisc.edu>

<https://www.fs.usda.gov/midewin>

<https://www.nachusagrasslands.org>



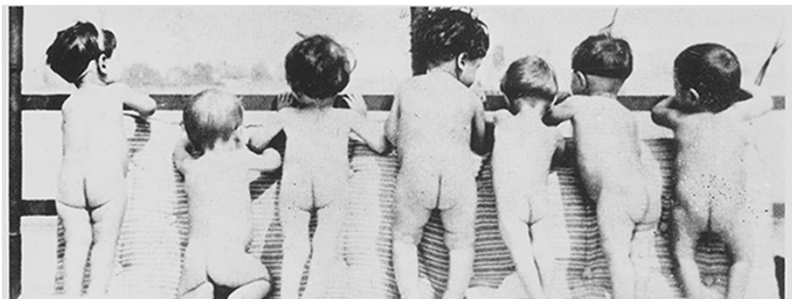
Kenneth Dwain Harrelson [GFDL (<http://www.gnu.org/copyleft/fdl.html>) or CC BY-SA 3.0 (<https://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons

## Rise of milk banking



Boston Floating Hospital; Tufts Digital Library; ID tufts:UA225.004.001.00005.00100

## Boston floating hospital



Naked toddlers on sundeck, ca. 1920

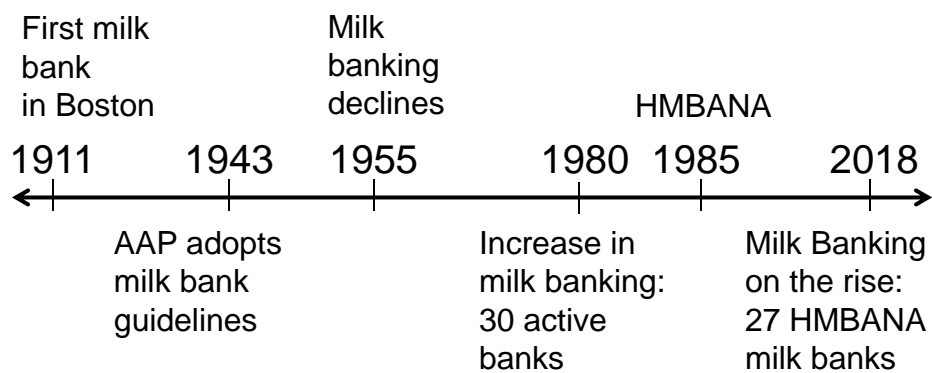
Boston Floating Hospital, babies' bottoms; Tufts Digital Library;  
ID tufts:UA225.004.001.00005.00109

## Doctors working in milk room

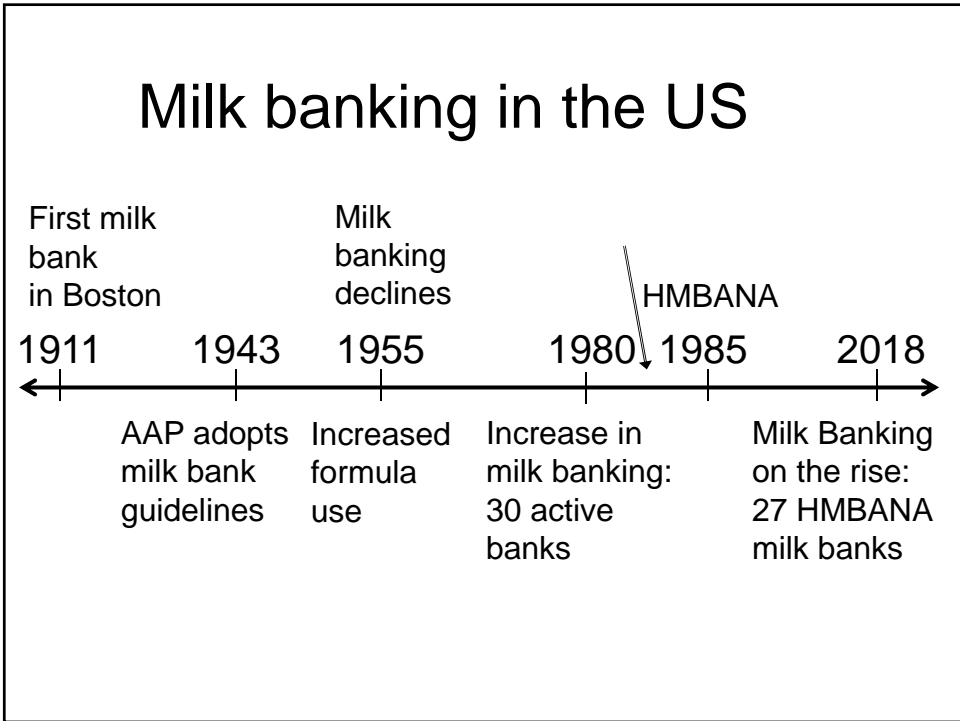
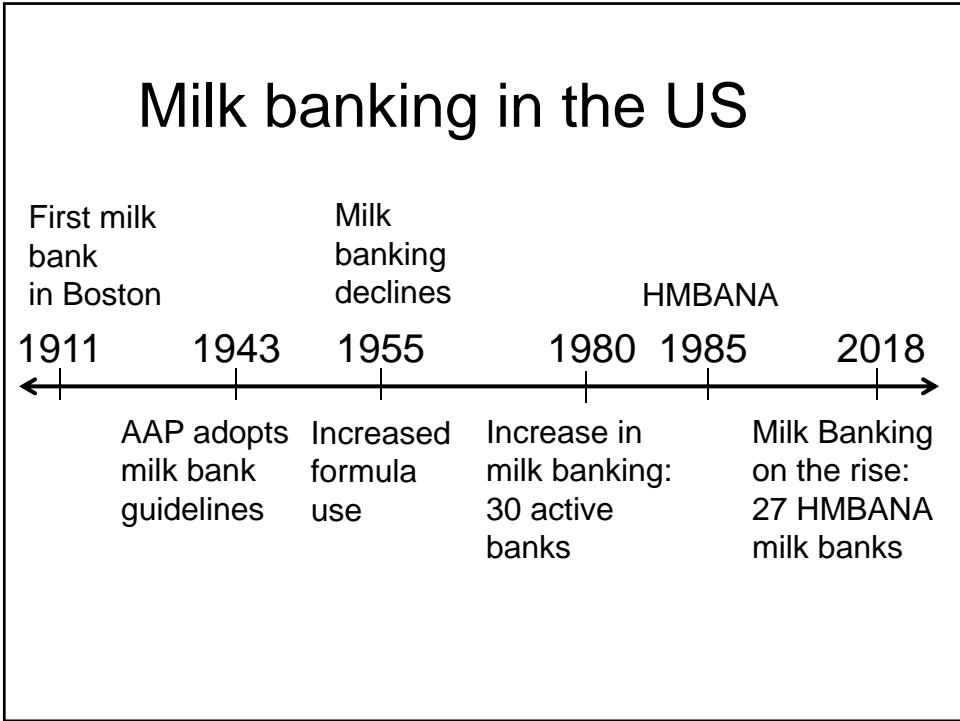


BFH Ship: Bottling of Mother's Milk; T.E. Marr and Son (1906)  
 Tufts Digital Library; ID tufts:MS099.001.001.00026.00003

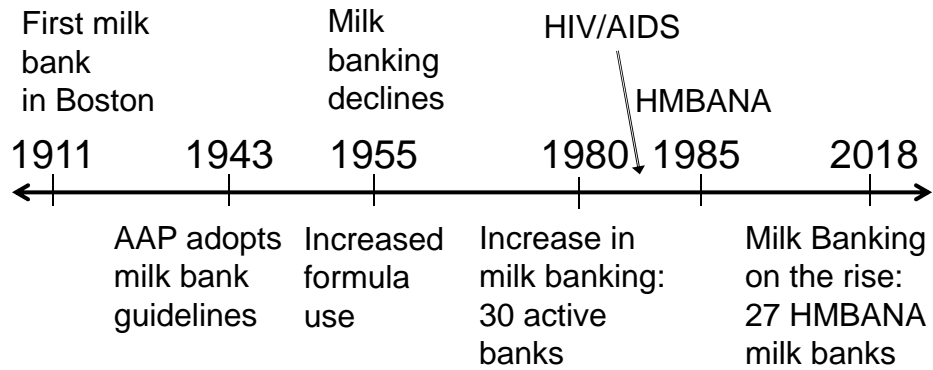
## Milk banking in the US







## Milk banking in the US



HUMAN MILK BANKING  
ASSOCIATION OF NORTH AMERICA

OUR MISSION  
REACHING THE MOST VULNERABLE INFANTS FIRST

- Affordable and safe
- 30+ year safety record
- Local and accessible
- Bereavement support programs
- Non-profit status ensures no one profits from milk

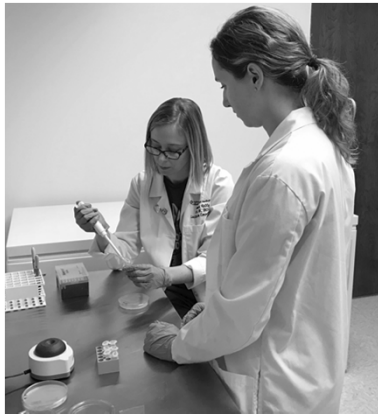


## Safety measures

- Donor blood testing
  - HIV, Hep B, Hep C, HTLV, Syphilis
- Pasteurization
- Health and lifestyle screening
- Physician/NP clearance
- Milk pooling (dilution effect)
- Pre- and post-pasteurization microbial testing
- Donors are not paid for milk
  - Removes incentive to dilute milk



## Milk processing



Pre-pasteurization  
microbial testing



Pooling and  
dispensing

## Pasteurization

Holder pasteurization  
Long time low heat (LTLH)

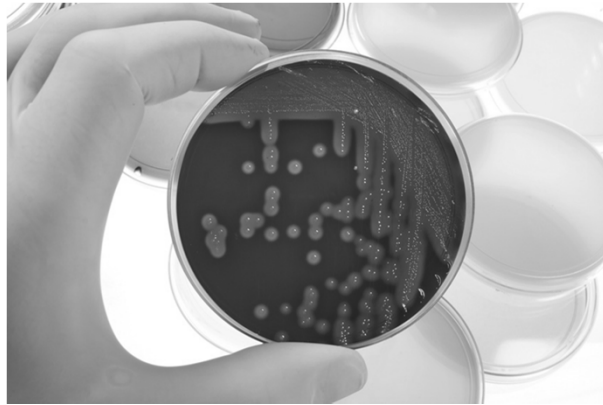
100% oligosaccharides and  
70% antibodies remain  
after pasteurization



- Milk is held at 62.5 degrees Celsius for 30 minutes
- Destroys CMV, HIV, Hepatitis B, and most bacteria
- Safe, effective, rigorously studied

## Micro testing

- Pre-pasteurization at milk bank microbiology laboratory
- Post-pasteurization at third party food testing lab



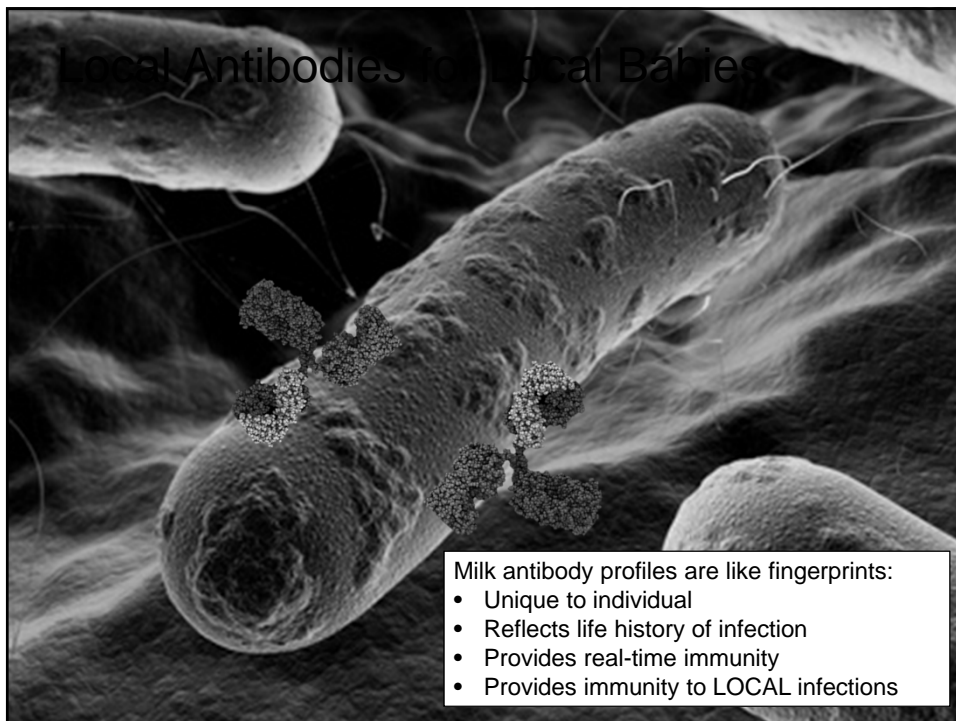
## Food safety and accreditation



- Federal, state, local, and accreditation inspections
  - Food and Drug Administration (FDA)
  - Illinois Department of Public Health (IDPH)
  - Elk Grove Village Health Department
  - Human Milk Banking Association of North America
- Current good manufacturing practices (cGMPs)
- Food Safety Modernization Act (FSMA)
  - Preventive Controls Qualified Individual (PCQI)
  - Food Safety Plan

## Donor milk in the hospital

- Reduce NEC & feeding intolerance in the NICU
- Provide antibodies and other immune properties
- GI diagnoses
  - Post surgical/post transplant nutrition
  - Feeding intolerance
- Newborn Supplementation
  - Hypoglycemia
  - Weight loss/dehydration
  - Hyperbilirubinemia
- Offer families feeding choices
- Increase patient satisfaction



Through the  
Microscope:  
A Closer Look  
at Human Milk



Summer Kelly, RN, MS, IBCLC

Mothers' Milk Bank of the Western Great Lakes

## Human milk decreases risk of NEC

### THE LANCET

Breast milk and neonatal necrotising enterocolitis

*Lucas & Cole, 1990*

NEC was 6-10 times more likely in formula fed infants.

### Journal of Perinatology

Role of human milk in extremely low birth weight infants' risk of necrotizing enterocolitis or death

*Meinzen-Derr et al., 2009*

The hazard of NEC or death decreased by 13% for every 100 ml/100g increase in human milk received in the first 14 days of life.

## Human milk in the NICU

- ↓ Sepsis<sup>1</sup>
- ↓ Feeding intolerance and diarrhea<sup>2</sup>
- ↓ Retinopathy of prematurity<sup>3</sup>
- ↓ Length of stay<sup>4</sup>
- Faster progression to full enteral feeds<sup>5</sup>
- Improved developmental outcomes<sup>6</sup>



1. Ronnestad et al., 2005    2. Boyd et al., 2007    3. Schanler et al., 2005  
 4. Schanler et al., 1999    5. Sisk et al., 2008    6. Vohr et al., 2006

## Donor milk decreases risk of NEC

- Formula fed infants have higher risk of NEC<sup>1</sup>
- NEC is 3-4 times less likely to occur when infants are fed donor milk versus formula<sup>2</sup>
- The combined evidence from three studies suggest that **donor milk reduces the risk of NEC by about 79%**<sup>3</sup>



1. Quigley & McGuire, 2014; 2. McGuire & Anthony, 2003; 3. Boyd et al., 2007



## Infant feeding choices

	Mom's Milk	Donor Milk	Formula
Human Milk Oligosaccharides	100%	100%	0%
sIgA antibody	100%	70%	0%
Lysozyme	100%	75%	0%
Lactoferrin	100%	40%	0%
Bile salt stimulated lipase	100%	0%	0%
White blood cells	100%	0%	0%

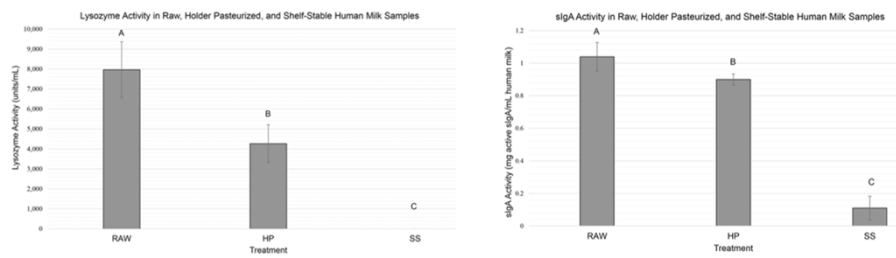
Data from Tully et al., 2001 (Altered)

## Pasteurized versus shelf stable donor milk

	Pasteurized Donor Milk	Shelf Stable Product
Human Milk Oligosaccharides	↑ 12.6	↓ 6.6
IgA antibody	↑ 0.32	↓ 0.19
Lysozyme	Same 0.03	Same 0.05
Lactoferrin	↑ 1.45	↓ 0.5
Alpha-lactalbumin	↑ 4.44	↓ 0.95
Total protein	↑ 1.0	↓ 0.8

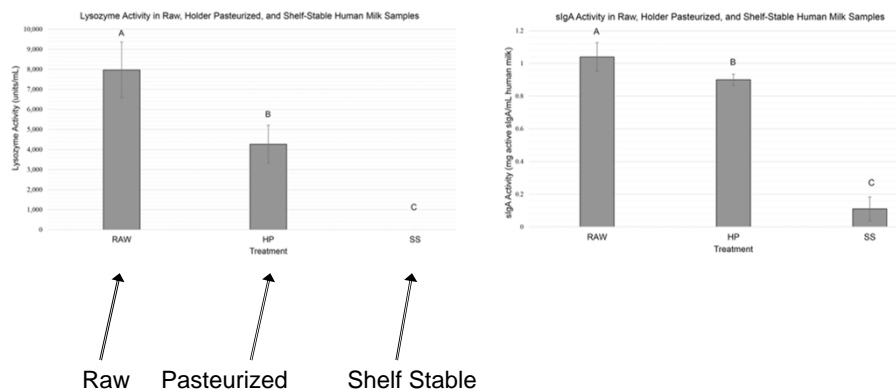
Data from Meredith et al., 2017

# Lysozyme and sIgA activity



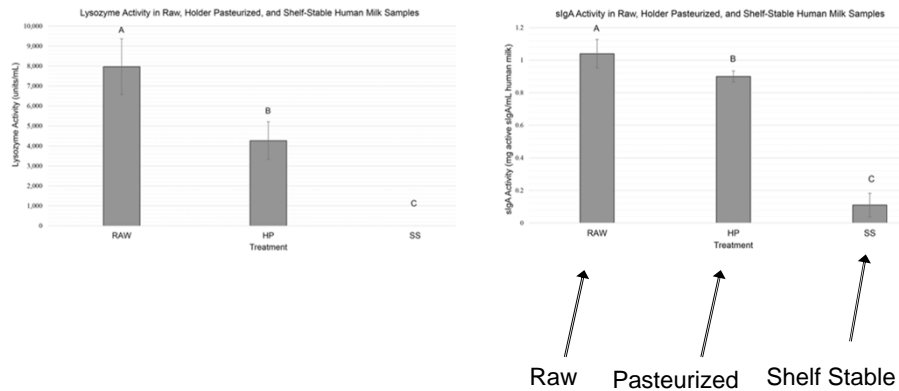
Lima et al., 2017

# Lysozyme and sIgA activity



Lima et al., 2017

## Lysozyme and sIgA activity



Lima et al., 2017

## Pasteurized versus shelf stable donor milk

	Pasteurized Donor Milk	Shelf Stable Product
Thiamine	0.77 mg/dl	0.68 mg/dl
Lysine	0.26 mg/l	0.14 mg/l

Data from Lima et al., 2018

“Fortification may be necessary if shelf-stable donor milk is a long-term feeding choice.” (Lima et al., 2018)

## Donor milk on mother baby unit

- Milk is species specific
  - Human milk is the biological norm for human babies
  - Formula is an artificial milk product with a cow milk base
- Increase feeding choices
- Donor milk on the mother baby unit associated with higher breastfeeding rates at discharge (Belfort et al., 2018)

Supplementation Offered on Mother Baby Unit	Exclusive Breastfeeding at Discharge
Donor milk or formula	77%
Formula only	56%

Data from Belfort et al., 2018

## Donor milk on mother baby unit

- Indications (Sen et al., 2018)
  - Weight loss/dehydration
  - Poor latch
  - Low supply
  - Physician request
  - Parent request
  - Multiples
  - SGA/IUGR
  - Hypoglycemia
  - Jaundice
  - Breast anomaly/surgical history
  - Mother/infant separation



## Donor milk for outpatients

- Bridge feedings for breastfeeding moms
- Adoption/surrogacy
- Formula intolerance
- Complications of prematurity
- Chronic illness
  - Spinal muscular atrophy (SMA)
- Maternal illness/hospitalization
- Maternal death
  - 3 days of donor milk at no charge (IL and WI families)



## Milk dispensaries



- Milk distribution sites
  - Dispense milk with prescription/order
  - Ideal for short-term supplementation
  - Increased access and ease
  - Increased feeding choices
- Locations
  - Pharmacies
  - Hospitals
  - Clinics



Dr. Anne Eglash



## Milk depots

- Milk collection sites
  - Accept milk
  - Store milk in freezer
  - Assist with milk transport to milk bank
  
- Locations
  - WIC clinics
  - Public health departments
  - Hospitals
  - Doctor's offices
  - Pharmacies
  - Lactation clinics



## Bereavement Milk Donation



Melinda's Gift



Poppy's Dream







Daddy's Little Champ

Good Night Room

Good Night Moon



Good Night Cow Jumping Over the Moon

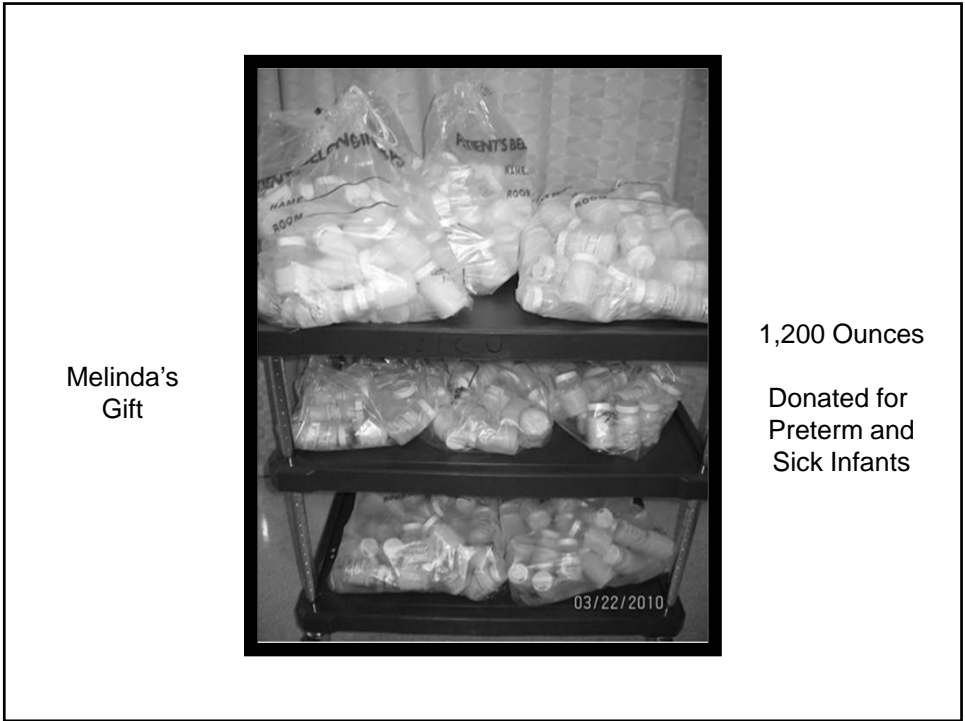
We Love You  
Melinda!



We Miss You  
So Much!



“Can you use Melinda’s Milk?”





## Making meaning

- Making meaning or meaning construction is:
  - The unique way that we interpret and make sense of our world<sup>1</sup>
  - Grieving parents can construct meaning by reflecting on their infant's impact or legacy<sup>2</sup>

"Melinda's milk went to NICU's  
all over the Midwest. She  
helped so many sick babies."



1. Milstein & Raingruber, 2007 2. Neimeyer, 2006

# Legacy

- What one leaves behind for their family, friends, caregivers, and society.
- Parents can use photographs, stories, scrapbooks, memory boxes, charity events, and other items and activities to reflect on their infant's legacy.



Pevtzow, L. (2012, November 7).

Hochberg, 2012

# Ritual

- Purposeful activity to acknowledge and honor the infant
  1. Meaning Making
  2. Intention
  3. Participation



Kobler, Limbo, & Kavanaugh, 2007

## Linking Object

- Linking objects tie the object to the infant.
  - They can symbolize the infant.
- There can be a strong association between the object and the infant.



DeSpelder & Strickland, 2015

## Welborn's Themes

1. Grieving the loss of motherhood
2. Pumping maintained connection to baby
3. Pumping out of necessity
4. Pumping as a tool for grieving loss
5. Support (or lack of) from nurses and lactation consultants
6. Determination not to throw milk away
7. Relief in learning about option to donate milk
8. Difficulty letting go of the milk
9. Giving meaning to the experience
10. Healing from loss
11. Importance of addressing lactation with bereaved mothers

Welborn (2012)

## Poppy's Dream

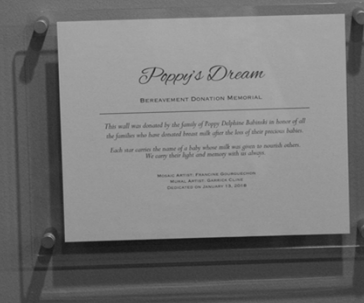


### Digital frame & dedication

Every star family is invited to submit a photo of their baby.

Families express gratitude for having a safe place to share these memories.

Parents have noted that they feel like their baby is part of a community, and they are glad the baby has "friends."







## Bereavement lactation support in the hospital

- Provide written evidence based guidelines for breast suppression after a loss<sup>1</sup>
- Include written information on milk donation options
  - [www.milkbankwgl.org](http://www.milkbankwgl.org)
  - [www.HMBANA.org](http://www.HMBANA.org)
- Keep milk safe in freezer and assist with milk bank paperwork
- Discuss options
  - “Some mothers choose to pump and donate milk to a milk bank. If you would like more information...”

1. Cole, 2012

## Incorporate meaning and legacy

- Offer to take pictures of the milk
- Ask if they would like to take a bottle home
- Describe or show a picture of Poppy's Dream
- Explain how milk is used in the NICU for preterm babies
- Pack the milk together
  - Include the mother's partner



## Important considerations

- Milk donation is offered as a choice
- Some mothers may need time to decide
  - Keep milk safe in unit freezer
- There are no exclusions for bereavement donors- all milk is accepted
  - There is no minimum donation- any milk is accepted
  - Some mothers may not need a blood draw
- Contact Milk Bank WGL
  - Bereavement brochures
  - Bereavement in-services for staff



## Video

- [www.milkbankwgl.org/donate-milk/](http://www.milkbankwgl.org/donate-milk/)



Mothers'  
Milk Bank  
of the Western  
Great Lakes

## Recipient Stories



AJ has been mostly on human donor milk and I'm so appreciative! Thank you so much! It's been a long week, but so grateful to the milk bank for getting us through those crucial first days in the NICU when I only had a teensy amount of pumped colostrum, but he needed a lot of donor milk.

~ AJ's Mom, Jequeatta





**Mothers' Milk Bank**  
of the Western Great Lakes

## Recipient Stories



“For all the dedicated mothers out there pumping and donating, you have improved her life tremendously! London was born at just 24 weeks and when my supply ran out, we relied on your milk to help her THRIVE ... From the bottom of our hearts, thank you!”

~ London's Mom, Rachel



## Non-profit milk bank resources

### Wisconsin/Illinois



Mothers' Milk Bank  
of the Western Great Lakes

[www.milkbankwgl.org](http://www.milkbankwgl.org)

- Mothers' Milk Bank of the Western Great Lakes
- [www.milkbankwgl.org](http://www.milkbankwgl.org)
- [info@milkbankwgl.org](mailto:info@milkbankwgl.org)
- 847-262-5134

### Other States



HUMAN MILK BANKING  
ASSOCIATION OF NORTH AMERICA

*Mobilizing the Healing Power of Donor Milk*

- Find your local HMBANA milk bank
- [www.HMBANA.org](http://www.HMBANA.org)

## Acknowledgements

THANK YOU:

- Generous milk donors
- Bereavement families
- Milk bank staff and volunteers
- Board of Directors
- Hospital and community supporters
  - Lactation consultants, nurses, physicians, peer counselors, doulas, palliative care, child life, dieticians, therapists...
- Nursing instructors at Rush University
- Staff at Advocate Lutheran General Hospital, Advocate Children's Hospital, Advocate Illinois Masonic



## References

- Boyd, C. A., Quigley, M. A., & Brockelhurst, P. (2007). Donor breast milk versus infant formula for preterm infants: Systematic review and meta-analysis. *Arch Dis Child Fetal Neonatal Ed*, 92, F169-F175. doi:10.1136/adc.2005.089490
- Cole, M. (2012). Lactation after perinatal, neonatal, or infant loss. *Clinical Lactation*, 3 (3), 94-100.
- DeSpelder, L. A. & Strickland, A. L. (2015). *The last dance: Encountering death and dying* (10<sup>th</sup> ed.). New York, NY: McGraw Hill Education.
- Hochberg, T. (2012). "Moments held" documentary. In R. Neimeyer's (Ed.) *Techniques of grief therapy*. New York, NY: Routledge.
- Kobler, K., Limbo, R., & Kavanaugh, K. (2007). Meaningful moments: The use of ritual in perinatal and pediatric death. *MCN The American Journal of Maternal Child Nursing*, 32 (5), 288-295.
- Lima, H. K., Wagner-Gillespie, M., Perrin, M. T., & Fogleman, A. D. (2017). Bacteria and bioactivity in holder pasteurized and shelf-stable human milk products. *Current Developments in Nutrition*, 1:e001438.
- Lima, H., Vogel, K., Wagner-Gillespie, M., Wimer, C. Dean, L. (2018). *Journal of Pediatric Gastroenterology and Nutrition*, (Ahead of Print). DOI: 10.1097/MPG.0000000000002094

- Lucas, A. & Cole, T. J. (1990). Breast milk and necrotizing enterocolitis. *Lancet*, 336. 1519-1523.
- McGuire, W., & Anthony, M. Y. (2003). Donor human milk versus formula for preventing necrotizing enterocolitis in preterm infants: Systematic review. *Arch Dis Child Fetal Neonatal Ed*, 88, F11-F14.
- Meinzen-Derr, J., Poindexter, B., Wrage, L., Morrow, A. L., Stoll, B., & Donovan, E. F. (2009). Role of human milk in extremely low birth weight infants' risk of necrotizing enterocolitis or death. *Journal of Perinatology*, 29, 57-62.
- Meredith-Dennis, L., Xu, G., Goonatileke, E., Lebrilla, C. B., Underwood, M. A., & Smilowitz, J. T. (2017). Composition and variation of macronutrients, immune proteins, and human milk oligosaccharides in human milk from nonprofit and commercial milk banks. *Journal of Human Lactation*. First published June 14, 2017. DOI: 10.1177/0890334417710635
- Milstein, J. M. & Raingruber, B. (2005). Choreographing the end of life in a neonate. *American Journal of Hospice and Palliative Medicine*, 24 (5), 343-349.
- Neimeyer, R. A. (2006). *Lessons of loss: A guide to coping*. Center for the Study of Loss and Transition. Memphis, TN.
- Pevtzw, L. (2012, November 7). Sharing Breast Milk with other Moms can be a Life Saver. *The Chicago Tribune*.
- Quigley & McGuire. (2014). Formula versus donor breast milk for feeding preterm or low birth weight infants (Review). *The Cochrane Library*.

- Ronnestad, A., Abrahamsen, T. G., Medbo, S., Hallvard, R., Lossius, K., Kaarensen, P. I.,...Markestad, T. (2005). Late-onset septicemia in a Norwegian national cohort of extremely premature infants receiving very early full human milk feedings. *Pediatrics*, 115(3), e269-e276. doi:10.1542/peds.2004-1833
- Schanler, R. J., Shulman, R. J., & Lau, C. (1999). Feeding strategies for premature infants: Beneficial outcomes of feeding fortified human milk versus preterm formula. *Pediatrics*, 103(6), 1150-1157.
- Schanler, R. J., Lau, C., Hurst, N. M., & Smith, E. O. (2005). Randomized trial of donor human milk versus preterm formula as substitutes for mothers' own milk in the feeding of extremely premature infants. *Pediatrics*, 116(2), 400-406. doi:10.1542/peds.2004-1974
- Sen, S., Benjamin, C., Riley, J., Heleba, A., Drouin, K., Gregory, K., & Belfort, M. B. (2018). Donor milk utilization for healthy infants: Experience at a single academic center. *Breastfeeding Medicine*, 13 (1), 28-33.
- Sisk, P. M., Lovelady, C. A., Gruber, K. J., Dillard, R. G., & O'Shea, T. M. (2008). Human milk consumption and full enteral feeding among infants who weight less than or equal to 1250 grams. *Pediatrics*, 121(6), e1528-e1533. doi:10.1542/peds.2007-2110
- Tully, D. B., Jones, F., & Tully, M. R. (2001). Donor milk: What's in it and what's not. *Journal of Human Lactation*, 17(2), 152-155.
- Vohr, B. R., Poindexter, B. B., Dusick, A. M., McKinley, L. T., Wright, L. L., Langer, J. C., & Poole, W. K. (2006). Beneficial effects of breast milk in the neonatal intensive care unit on the developmental outcome of extremely low birth weight infants at 18 months of age. *Pediatrics*, 118, e115-e123. doi: 10.1542/peds.2005-2382
- Welborn, J. M. (2012). The experience of expressing and donating breast milk following a perinatal loss. *The Journal of Human Lactation*, 28 (4), 506-510.